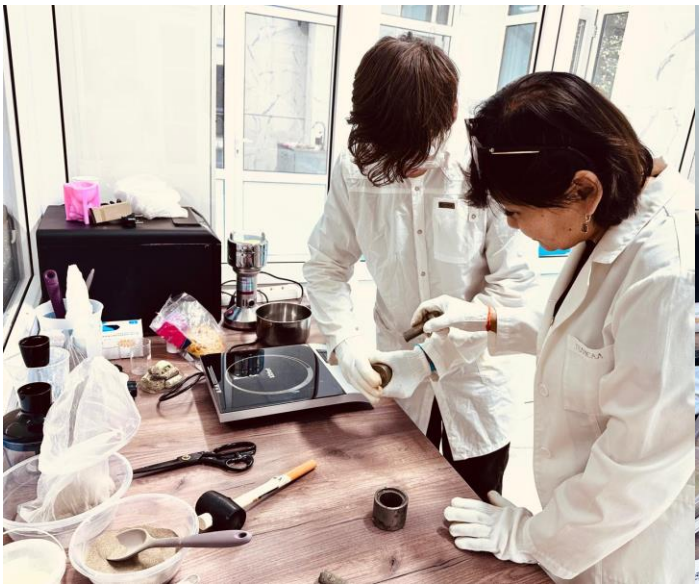
The objective of the research is to develop a scientifically grounded and technologically feasible system for processing sulfur-containing and oil waste from the oil and gas industry using concentrated solar energy. The final outcome of the program is the production of functional composite materials for construction and technical applications within a unified closed-loop technological cycle..

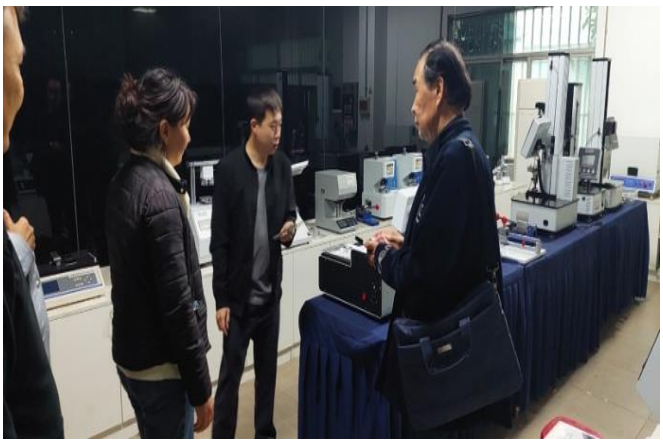
The implementation of the program will enable the reduction of accumulated oil sludge and sulfur-containing waste stored at disposal sites, decrease the environmental risks associated with their long-term storage, reduce specific energy consumption through the use of a renewable heat energy source, develop a technological regulation for industrial-scale upscaling of the process, and create a pilot prototype of a solar installation suitable for further scaling.

An analytical review was conducted, and a set of samples (gas, oil sludge, oil-contaminated soil, formation water, and soil) was formed for subsequent laboratory determination of their physicochemical properties (responsible person – Tukhfatov Zh.K.).



Researchers J.S. Yessenamanova and N.R. Tauova are carrying out experimental work on the production of a sulfur-based composite material. The main components have been weighed, and the process of obtaining the sulfur composite has been carried out.

In the period from January 19 to 25, 2026, members of the working group were on a business trip to China, during which they visited Hengke Instruments (Dongguan Hengke Automation Equipment Co. Ltd.) in Dongguan and Shenzhen Puxin Technology Co. Ltd. in Shenzhen.



The main purpose of the trip was training and professional development at specialized industrial enterprises.

During the visit, the participants became familiar with the technological processes, equipment, principles of automation, and quality control systems used at these enterprises. Technical consultations were held with engineers; the features of equipment operation and maintenance were studied; and practices for diagnosing and optimizing production lines were reviewed.

The business trip was productive and contributed to the expansion of professional knowledge and practical skills.

In Almaty, at al-Farabi Kazakh National University, as well as in Aktau, meetings were held with scientists and specialists, during which technical and technological issues related to the development of methods for extracting petroleum products during the purification of oil waste using solar devices equipped with concentrating elements, as well as the production of sulfur-based composite materials, were discussed.


Researchers M.K. Jexenov and D.A. Skorobogatov, in collaboration with scientists, specialists, and laboratory staff of al-Farabi Kazakh National University (Almaty, Kazakhstan), are conducting experimental studies on the decontamination of oil waste.


Researchers A.I. Abilkhairov, A.S. Kalauova, and A.U. Imangalieva are conducting studies to evaluate the physical and mechanical characteristics of experimental samples.